PERMIT CHECK LIST

The following people have reviewed the permit:

Reviewing Permitting Engineer: _____

Air Inspector: _____

Air Compliance Manager: _____

Date: August 5, 2014

Source Name: Calpine Mid-Atlantic Generation LLC Registration No: 40304 Id. No.: 51-001-0006

Source Location: 21417 Taylor Road, Tasley, VA 23441 (Accomack County)

Mail Address: 500 Delaware Avenue, Suite 600, Wilmington, Delaware 19801

Source Status: ___ Greenfield ✓ Currently operating

Source Classification: ___ Minor ___ SynMinor ___ State Major ___ PSD Major ✓ TV Major

Permit Action: Renewal of September 21, 2009 Title V Operating Permit.

✓ **Inspector Contacted/Consulted**

Permit Action Program:

___ NSR ___ SOP ✓ TV ___ Major HAP

Permit Action Type:

✓ Renewal

Y (Y/N) Permit Includes All Emission Units at Source.

N (Y/N) Permit Allows Source to avoid Title V/MACT/etc.

After this permit, source is: ✓ Major (A) ___ Minor (B) ___ Synthetic minor (SM)
(NOx, SO_2, PM10, & CO Pollutants)

Permit Application Review

✓ Permit application submitted

Application Received Date: March 19, 2014

Application Complete Date: March 19, 2014

Permit Deadline Date: September 19, 2015

✓ Document Certification Form received

NA Confidential information with sanitized copy

NA Copy of letter from local official for Greenfield, or major modified sources

NA Copy of letter sent to FLM if applicable

Y Notification of Affected State(s): Maryland

This permit supersedes permit(s) dated: None – Title V Permit renewal

Regulatory Review

BACT Determination:

✓ TV/SOP/BACT not applicable

Y (Y/N) NSPS/MACT/NESHAPS Applicability: If Y, Subpart(s): ZZZZ MACT

Y (Y/N) Existing Rules (9 VAC 5 Chapter 40) Applicability: If Y, Rule(s): Articles 1, 4, & 8 of Chapter 40

Regulatory Review (cont'd)

Toxic Pollutants (check one):

___ Exempt, or ___ in compliance with 9 VAC 5-60-320, or ✓ not evaluated.

Comments: Not applicable to Title V Permit renewal.

Modeling (check one):

NA Attached (including background monitors), or

NA Copy of approval letter from modeling section,

✓ No modeling required by agency policy (< modeling significance levels, etc.)

Site Suitability:

✓ Site suitable from an air pollution standpoint, inspection date: August 28, 2014

N Calculation sheet(s) attached

N (Y/N) (CAM) Compliance Assurance Monitoring Applicable

Permit includes: ___ Stack Testing ___ CEM ✓ VEE by source

Public Participation

Y (Y/N) Public Noticed. If yes, Public Notice Date: **Wednesday, June 4, 2014**

N (Y/N) Public Notice Comments. If yes, number and nature of comments:

N (Y/N) Public Hearing

EPA Review

Y (Y/N) EPA Review. If yes, Date proposed permit sent to EPA: **Friday, May 30, 2014**

N (Y/N) EPA Comments. If yes, give a brief summary_____.

Other Comments and Final Recommendations:

Comments: This permit action is for a Title V Operating Permit renewal. The Statement of Legal and Factual Basis contains the supporting documentation for issuance of this permit. The permit format was updated to conform to the latest Title V boilerplate. As an affected state, Maryland has been notified of the existence of this permit. The facility is registered as an existing source and is subject to the applicable regulations contained in 9 VAC 5 Chapters 40, 80, and 170. This existing source status is confirmed in a DEQ letter dated July 27, 1972, addressed to Mr. H. P. Holen of Delmarva Power and Light Company. Furthermore, there are no underlying NSR permits associated with the Title V permit.

On June 2, 2010, Calpine Mid-Atlantic Generation LLC was issued an exemption letter by the DEQ for the facility for the installation and operation of an inlet air fog-atomizing evaporative cooling system (HPWI Fog Intercooling System) on the distillate oil-fired simple-cycle combustion turbine (URN TA10) at the facility. The inlet air fog-cooling device itself does not emit any pollutants; the system simply helps to recoup turbine power output losses incurred when ambient air temperatures are high. However, use of the inlet air fog-cooling system does allow for the combustion of additional fuel to provide greater power output at the same ambient air temperature when utilized. The increase in pollutant emissions resulting from the combustion of additional fuel by the combustion turbine (URN TA10) were calculated to be less than the PSD significant emission levels, Title V insignificant emission levels, and Article 6 exempted levels. The HPWI Fog Intercooling System is included in the facility's Title V Operating Permit as an insignificant emissions unit.

The EPA has taken several actions regarding Greenhouse Gas (GHG) emissions under the Clean Air Act (CAA). The result of those actions is that certain PSD and Title V permits issued on or after January 2, 2011

Regulatory Review (cont'd)

must address GHG emissions. For any source, GHG emissions may be a mixture of up to six (6) different compounds, namely, Carbon dioxide, Nitrous oxide, Methane, Hydrofluorocarbon gases, Perfluorocarbon, and Sulphur Hexafluoride**.** The amount of GHG emissions emitted from an emissions unit is therefore the sum of these compounds and can be expressed in both a mass basis and an equivalent CO_2 basis (CO_2e).

Potential CO_2 mass emissions from the simple cycle combustion turbine (URN TA10) were calculated using the *Tier 3 Calculation Methodology* listed in 40 CFR Part 98, Subpart C as follows:

CO_2 mass emissions = 44/12 * Fuel * CC * 0.001

Where:

CO_2 mass emissions = Annual CO_2 mass emissions for a specific fuel type (in metric tons).

44/12 = Ratio of molecular weights of CO_2 to Carbon.

Fuel = Volume of the fuel combusted during the year (in gallons).

CC = Average carbon content of the liquid fuel (Carbon Content in kg per gallon of fuel). The average carbon content (CC) of Number 1 distillate fuel oil is (19.98 kg/MMBtu) * (0.139 MMBtu/gal) or 2.777 kg/gal of fuel oil.

0.001 = Conversion factor from kilograms to metric tons.

The CO_2 mass emission equation above applies to stationary emission units with a maximum rated heat input capacity greater than 250 MMBtu/hr that combusts any type of fuel listed in Table C-1 of 40 CFR Part 98, Subpart C, except for municipal solid waste (MSW).

As there are no permit limitations for fuel throughput or operating hours in a given year, the potential fuel consumption (worst-case scenario) for the stationary combustion turbine (URN TA10) was calculated as:

(460 MMBtu/hr) * (1 gallon fuel/0.139 MMBtu) * (8,760 hrs/yr) = 28,989,928 gallons of No. 1 Distillate Fuel Oil

Using these input values in the equation above yields a calculated potential CO_2 mass emission of:

(44/12) * (28,989,928 gals) * (2.777 kg/gal) * (0.001) = **295,185.11 annual metric tons of CO_2**

Calculations for Methane (CH_4) and Nitrous oxide (N_2O) mass emissions from the simple cycle combustion turbine (URN TA10) must also be addressed as part of the total GHG emissions. Annual CH_4 and N_2O mass emissions are calculated in a similar manner using the HHV for Number 1 distillate fuel oil and the default CH_4 and N_2O emission factors listed in Table C-2 of 40 CFR Part 98, Subpart C in the following equation:

CH_4 or N_2O = 0.001 * Fuel * HHV * EF

Where:

CH_4 or N_2O = Annual CO_2 mass emissions for a specific fuel type (in metric tons).

Fuel = Volume of the fuel combusted during the year (in gallons).

HHV = Default high heat value of 0.139 MMBtu/gallon for the fuel listed in Table C-1 of 40 CFR Part 98, Subpart C.

EF = Fuel-specific default emission factors for CH_4 and N_2O, of 3.0×10^{-3} kg CH_4/MMBtu and 6.0×10^{-4} kg N_2O/MMBtu listed in Table C-2 of 40 CFR Part 98, Subpart C.

0.001 = Conversion factor from kilograms to metric tons.

Using these input values in the equation yields a calculated potential CH_4 mass emission of:

(0.001) * (28,989,928 gals) * (0.139 MMBtu/gal) * (3.0×10^{-3} kg CH_4/MMBtu) = **12.09 annual metric tons CH_4**

and a calculated potential N_2O mass emission of:

(0.001) * (28,989,928 gals) * (0.139 MMBtu/gal) * (6.0×10^{-4} kg N_2O/MMBtu) = **2.42 annual metric tons N_2O**

Regulatory Review (cont'd)

Global Warming Potential (GWP) conversion factors are used to convert a given GHG mass emission to a similar CO_2 mass emission (CO_2e) for the purpose of combining all the GHGs together as a single equivalent gas. A GWP is a relative measure of how much heat energy a GHG traps in the atmosphere. It compares the amount of heat trapped by a certain mass of the GHG in question to the amount of heat trapped by a similar mass of CO_2. A GWP is calculated over a specific time interval, commonly 20, 100, or 500 years. GWPs are expressed as a factor of CO_2 (whose GWP is standardized to 1). Methane (CH_4) has a GWP of 21 and Nitrous oxide (N_2O) a GWP of 310 at 100 years. Based on these GWP conversion factors, the Methane (CH_4) and Nitrous oxide (N_2O) mass emissions from the simple cycle combustion turbine (URN TA10) can be expressed as equivalent CO_2 mass emissions (CO_2e) as follows:

12.09 annual metric tons CH_4 = 12.09 * 21 = **253.89 annual metric tons of CO_2e**

2.42 annual metric tons N_2O = 2.42 * 310 = **750.20 annual metric tons of CO_2e**

The combined total potential annual equivalent CO_2 mass emission (CO_2e) is:

(295,185.11 + 253.89 + 750.20) or **296,189.20 annual metric tons of CO_2e** from the combustion of Number 1 distillate fuel oil in the simple cycle combustion turbine (URN TA10).

There have been no major modifications to the Calpine Mid-Atlantic Generation LLC Tasley Energy Center facility that would have resulted in the issuance of a PSD permit. Therefore, there are no applicable requirements for the facility specific to GHG emissions at this current time.

Final Recommendation: Recommend Approval.

Environmental Engineer's Signature: _____

Air Permit Manager's Signature: _____

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
TIDEWATER REGIONAL OFFICE
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Molly Joseph Ward
Secretary of Natural Resources

David K. Paylor
Director

Maria R. Nold
Regional Director

STATEMENT OF LEGAL AND FACTUAL BASIS

Calpine Mid-Atlantic Generation LLC
Tasley Energy Center - Accomack County, Virginia
Permit No. TRO-40304
Effective Date: July 24, 2014
Expiration Date: July 23, 2019

Title V of the 1990 Clean Air Act Amendments required each state to develop a permit program to ensure that certain facilities have federal Air Pollution Operating Permits, called Title V Operating Permits. As required by 40 CFR Part 70 and 9 VAC 5 Chapter 80, Calpine Mid-Atlantic Generation LLC has applied for a Title V Operating Permit for its Tasley Energy Center facility. The Department has reviewed the application and has prepared a draft Title V Operating Permit.

Permit Writer: _____ Date: **July 24, 2014**
James A. White Jr.
(757) 518-2180

Regional Air Permits Manager: _____ Date: **July 24, 2014**
Troy D. Breathwaite

Regional Director: _____ Date: **July 24, 2014**
Maria R. Nold

I. FACILITY INFORMATION

Permittee
Calpine Mid-Atlantic Generation LLC
500 Delaware Avenue, Suite 600
Wilmington, Delaware 19801

Facility
Tasley Energy Center
21417 Taylor Road
Tasley, Virginia 23441 (Accomack County)

AFS Identification Number: 51-001-00006

Source Description

SIC Code: 4911 - Electric Power Generation

The Tasley Energy Center, operated by Calpine Mid-Atlantic Generation LLC, provides standby electric power generation using a distillate oil-fired simple cycle combustion turbine generator. The source was issued an initial Title V operating permit on November 2, 1999 for the 460 MMBTU/hr simple cycle combustion turbine and an associated black-start diesel internal combustion engine (CI RICE) rated at 4.64 MMBTU/hr. Fuel for both combustion units is stored in a 504,000-gallon storage tank. The facility was issued a Title V permit due to its PTE major source status for NO_X, SO_2, PM_{10}, and CO pollutant emissions. The source is located in an attainment area for all pollutants. On July 1, 2010, the Connectiv Delmarva Generation, Inc. Tasley electric power generation facility was purchased by the current owner, Calpine Mid-Atlantic Generation LLC.

Compliance Status

A full compliance evaluation of this facility, with site visit, was conducted on August 28, 2013. In addition, all reports and other data required by permit conditions or regulations, which are submitted to DEQ, are evaluated for compliance. Based on these compliance evaluations, the facility has not been found to be in violation of any state or federal applicable requirements at this time.

II. EMISSION UNIT IDENTIFICATION

The emissions units at this facility are the following:

Unit Ref. No. (URN)	Stack ID	Emission Unit Description	Manufacturer and Date of Construction	Size/Rated Capacity*	Applicable Permit Date
TA10	ST10	33 MW Simple Cycle Combustion Turbine	Westinghouse Model No. W-251B, installed in June 1972	460 MMBtu/hr	Nov. 2, 1999
TA20	ST20	635 HP Black-Start CI RICE	Cummins Model No. V1710, installed in June 1972	4.64 MMBtu/hr	Nov. 2, 1999

* The Size/Rated capacity is provided for informational purposes only, and is not an applicable requirement

III. EMISSIONS INVENTORY

A copy of the 2012 annual emission update is attached. Emissions are summarized in the following table:

2012 Actual Emissions

2012 Criteria Pollutant Emissions in Tons/Year					
Pollutant	**VOC**	**CO**	**SO_2**	**PM_{10}**	**NO_x**
Facility wide Totals	0.68	0.00	0.0006	0.50	0.58

IV. EMISSION UNIT APPLICABLE REQUIREMENTS

The following Virginia Administrative Codes that have specific emission requirements have been determined to be applicable:

9 VAC 5 Chapter 170, General Administration

9 VAC 5 Chapter 40, Existing Stationary Sources

9 VAC 5 Chapter 40, Part II, Article 1: Visible Emissions and Fugitive

9 VAC 5 Chapter 40, Part II, Article 4: General Process Operations

9 VAC 5 Chapter 40, Part II, Article 8: Fuel Burning Equipment Standards

9 VAC 5 Chapter 80, Part II, Article 1: Federal Operating Permits for Stationary Sources

9 VAC 5 Chapter 80, Part II, Article 2: Permit Program Fees for Stationary Sources

9 VAC 5 Chapter 80, Part II, Article 4: Insignificant Activities

This Title V permit renewal has replaced the NOx Budget Trading Program requirements that were included in the 2004 Title V permit with those of the CAIR requirements (CAIR application is included as an attachment to the permit).

CAM Applicability

This current Title V permit requires effective periodic monitoring of the permitted equipment. The CAM Rule is not applicable to the equipment at this facility, as there is no add-on control technology used.

Limitations

Emission limits for URN TA10 and URN TA20 remain unchanged from the previous 2009 Title V permit. These consist of:

· Required use of distillate fuel oil having 0.5 % or less sulfur content in URN TA10 and TA20;

· Visibility limits for URN TA10 based on existing source regulations;

· Calculated SO_2 and PM emission limits for URN TA10 based on existing source regulations;

· Calculated SO_2 emission limits for URN TA20 based on existing source regulations.

Monitoring

The Simple Cycle Combustion Turbine (URN TA10) has periodic monitoring for opacity consisting of the use of EPA Method 9, combined with fulltime parametric monitoring of gas temperature telemetry, and an alarm notification system, to maintain efficient combustion and minimize the likelihood of excessive visible emissions. The black-start CI RICE (URN TA20), due to its limited use, is not subject to opacity and monitoring requirements. However, the CI RICE is subject to the applicable monitoring requirements of 40 CFR 63, Subpart ZZZZ for existing stationary black-start engines located at an area source of HAPs. These applicable requirements have been included in the 2014 Title V renewal.

Recordkeeping and Reporting

The permit includes requirements for maintaining records of all monitoring and testing required by the permit. These records include fuel sulfur content records, visible emission evaluation records, records of annual operating hours (updated monthly), stack test records, maintenance records, and a spare parts inventory. The stationary CI RICE (URN TA20) is subject to the applicable recordkeeping requirements of 40 CFR 63, Subpart ZZZZ for existing black-start engines located at an area source of HAPs. These applicable requirements have been included in the 2014 Title V renewal.

Testing

The permit does not require source testing. The Department and EPA have authority to require testing not included in this permit if necessary to determine compliance with an emission limit or standard.

Streamlined Requirements

Permit Condition 7 (Fuel Burning Equipment Requirements - (URN TA10) - Visible Emissions Evaluations) in the Title V permit streamlined out the initial visible emissions evaluation (VEE) requirement for the simple cycle combustion turbine (URN TA10), as it had previously been satisfied. VEEs are now performed based on the number of operating hours per year and are to be conducted during the period of maximum expected visible emissions under normal unit and facility operations in accordance with 40 CFR 60 Appendix A, Method 9.

V. GENERAL CONDITIONS

The "General Conditions" section of this Title V permit was updated using the most recent DEQ Title V permit boilerplate where appropriate.

INAPPLICABLE REQUIREMENTS

NSPS Subpart GG - does not apply to the simple cycle combustion turbine (URN TA10) as it was constructed prior to the Subpart's applicability date of October 3, 1977.

NSPS Subpart IIII - does not apply to the stationary CI RICE (URN TA20) as it was constructed before, and not modified or rebuilt after, the Subpart's applicability date of July 11, 2005.

NSPS Subpart Kb - does not apply to the two petroleum storage tanks. Fuel oil storage tank TA100 was installed before, and not modified after, the 1984 applicability date for that Standard. Lubrication oil storage tank TA101 has a maximum capacity of less than 10,000 gallons.

Chapter 40, Article 4 (Existing source particulate standard) - does not apply to URN TA20 as the definition of process weight excludes liquid fuels.

Chapter 40, Article 8 (Fuel burning equipment standards) - does not apply to URN TA20 as these standards do not apply to internal combustion engines.

Chapter 40, Article 37 (Tank standards) - does not apply to storage tanks TA100 or TA101 as the vapor pressures of the contents of both tanks are below 1.5 psa, the articles applicability threshold.

The startup, shut down, and malfunction opacity exclusion listed in 9 VAC 5-40-20.A.3 cannot be included in any Title V permit. This portion of the regulation is not part of the federally approved state implementation plan. The opacity standard applies to existing sources at all times including startup, shutdown, and malfunction. Opacity exceedance during malfunction can be affirmatively defended provided all requirements of the affirmative defense section of this permit are met. Opacity exceedance during startup and shut down will be reviewed with enforcement discretion using the requirements of 9 VAC 5-40-20 E, which state that "At all times, including periods of startup, shutdown, soot blowing and malfunction, owners shall, to the extent practicable, maintain and operate any affected facility including associated air pollution control equipment in a manner consistent with air pollution control practices for minimizing emissions."

INSIGNIFICANT EMISSION UNITS

The insignificant emission units are presumed to be in compliance with all requirements of the Clean Air Act as may apply. Based on this presumption, no monitoring, recordkeeping, or reporting shall be required for these emission units in accordance with 9 VAC 5-80-110.

The following emissions units at the facility are identified in the application as insignificant emissions units under 9 VAC 5-80-720:

Unit Ref. No. (URN)	Emissions Unit Description	Citation	Pollutant Emitted 9 VAC 5-80-720 B	Rated Capacity 9 VAC 5-80-720 C
TA100	#2 Distillate Fuel Oil Storage Tank	9 VAC 5-80-720 B.2	VOC	504,000 gallons
TA101	Lube Oil Storage Tank	9 VAC 5-80-720 B.2	VOC	1,650 gallons
HPWI Fog Intercooling System	Inlet air fog-atomizing evaporative cooling system	9 VAC 5-80-720 B.1	None	---

These emissions units are presumed to be in compliance with all requirements of the federal Clean Air Act as may apply. Based on this presumption, no monitoring, recordkeeping, or reporting shall be required for these emissions units in accordance with 9 VAC 5-80-110.

CONFIDENTIAL INFORMATION

The permittee did not submit a request for confidentiality. All portions of the Title V permit application are suitable for public viewing.

PUBLIC PARTICIPATION

The proposed permit will be placed on public notice in the Eastern Shore News from **Wednesday, June 4, 2014** to **Monday, July 7, 2014**.

MANDATORY GREENHOUSE GAS REPORTING

40 CFR Part 98 - Mandatory Greenhouse Gas Reporting: The provisions of the Final Rule for the Mandatory Reporting of Greenhouse Gases (GHG) (40 CFR Part 98) require owners and operators of general stationary fuel combustion sources that emit 25,000 metric tons (27,558 short tons) or more per year of CO_2 equivalent (CO_2e) in combined emissions from such units, to address the combined emissions of these GHGs annually. The definition of "applicable requirement" in 40 CFR 70.2 and 71.2 does not include requirements such as those included in Part 98, promulgated under Clean Air Act (CAA) section 114(a)(1) and 208. Therefore, the requirements of 40 CFR Part 98 are not applicable under the Title V permitting program.

As a result of several EPA actions regarding GHG under the CAA, emissions of GHG must be addressed for a Title V permit renewed after January 1, 2011. Potential annual CO_2e emissions were calculated for the Calpine Mid-Atlantic Generation LLC Tasley Energy Center, pursuant to the procedures in 40 CFR Part 98, Subpart C for the stationary fuel combustion source at the facility and were determined to be 296,189.20 annual metric tons (326,492.61 short tons). There have been no major modifications to the Tasley Energy Center facility that would have resulted in the issuance of a PSD permit. Therefore, there are no applicable requirements for the facility specific to GHG emissions at this current time.